stirps. There are also notes by Mr. R. South, on British *Lepidoptera* occurring in Japan; and by Mr. A. H. Jones, on some South European *Lepidoptera*, with remarks on the genera *Thais* and *Euchloe*. The only paper relating to a different order is by Mr. E. Saunders, on collecting British *Hemiptera*.

THE Royal Society for the Prevention of Cruelty to Animals has sent us the twenty-ninth annual volume of "The Animal World," and a new volume of the "Band of Mercy." Both volumes are profusely illustrated with pictures of animals, and they will assist the educational work of the Society. Children interested in animals or natural history—and what children are not?—would regard either of the volumes as an acceptable present for Christmas or the New Year.

THE twenty-first volume of *Knowledge*, containing the monthly parts published during the current year, has been received. The articles in the volume deal with many scientific subjects, but the most prominent features are astronomy and natural history. The chief contributors are Mr. R. Lydekker, who writes on various zoological matters; Prof. Grenville Cole, who deals with a number of geological structures and problems; Mr. A. Vaughan Jennings, who contributes a series of botanical studies; and Mr. E. W. Maunder, who writes on interesting astronomical objects and events. Numerous illustrations, many of them full-page plates, and including reproductions of several of Dr. Roberts's marvellous photographs, adorn the pages of the volume.

MR. WILLIAM MARRIOTT informs us that on January 2, 1899, the offices of the Royal Meteorological Society will be removed to Princes Mansions, 70 Victoria Street, Westminster, S.W., to which address all communications, on and after that date, should be forwarded.

THE Tidal Survey branch of the Department of Marine and Fisheries of the Dominion of Canada has issued a collection of tide-tables for Halifax, Quebec, and St. John, for the year 1899, with tidal differences for the Atlantic coast of Nova Scotia, and for the St. Lawrence River, from Three Rivers to Gaspe.

PSYCHOLOGISTS and students of the philosophy of science will be interested in the announcement that, under the title of "Truth and Error, or the Science of Intellection," Messrs. Kegan Paul, Trench, Trübner, and Co., Ltd.. will shortly publish a new book by Mr. J. W. Powell, the Director of the United States Bureau of American Ethnology, and sometime Director of the United States Geological Survey.

THE Tuesday evening penny science lectures will be resumed at the Royal Victoria Hall, Waterloo Bridge Road, on January 3, when the Rev. R. H. Whitcombe will discourse on "Science Jottings in Switzerland." On January 10, Mr. R. A. Gregory will lecture on "Astronomy before Telescopes"; and on January 17, Prof. Farmer will lecture on "Plants as Engineers." On January 24, Mr. C. W. Andrews will give an account of his work on "Christmas Island"; and on January 31, Prof. Frank Clowes will lecture on "Old Father Thames."

A NUMBER of forthcoming works on scientific subjects appear in the *Book Circular* (No. 69, Scientific Series), just issued by Messrs. Williams and Norgate. Among the volumes announced we notice the following:—The second volume of Dr. F. Dannemann's "Grundriss einer Geschichte der Naturwissenschaften," entitled "Geschichte der Naturwissenschaften aller Völker und Zeiten."—Prof. Ernest Haeckel's lecture to the Fourth International Zoological Congress at Cambridge will be issued, with notes and tables, under the title "Unsere gegenwärtige Kenntniss vom Ursprung des Menschen."—Another work by Prof. Haeckel, which is announced for publication in January, is "Kunstformen der Natur."—A work by Prof. O Bütschli, Professor of Zoology at Heidelberg, being a continuation of the same author's "Untersuchungen über micros kopische Schäume," of which an English translation has been issued.—The second part of the second volume of Dr. Paul Knuth's "Handbuch der Blüten biologie," containing Lobeliaceæ to Coniferæ.—M. Riban, of the University of Paris, has prepared a "Traité d'analyse chimique quantitative par l'Electrolyse."—"La photographie animée," by E. Trutat, Director of the Natural History Museum of Toulouse.—A work by Prof. Lebon, of the Lycée Charlemagne, Paris, entitled "L'Histoire abrégée de l'Astronomie."—A volume by M. E. Bouty, Professeur de la Faculté des Sciences, on "Electricité à ondes Herziennes. Rayons X."

THE additions to the Zoological Society's Gardens during the past week include two Red-bellied Squirrels (*Sciurus variegatus*) from Trinidad, presented by Master Lawrence; a Palm Squirrel (*Sciurus palmarum*) from India, presented by Dr. G. Lindsay Johnson; a Pluto Monkey (*Cercopithecus leucampyx*, ♂) from Congoland, deposited; a Nutcracker (*Nucifraga caryocatactes*), a Common Sheldrake (*Tadorna cornuta*) European, purchased.

OUR ASTRONOMICAL COLUMN.

A TOTAL ECLIPSE OF THE MOON.—On Tuesday next (December 27) the moon will pass entirely into the shadow of the earth, and be totally eclipsed. The following are some of the particulars which may be useful to those who wish to observe this phenomenon, but fuller information, together with a list of stars to be occulted, will be found in the *Nautical Almanac* and the *Companion to the Observatory*.

	h.	m.	
First contact with the penumbra, Dec. 27,	8	26·5	G.M.T.
,, ,, shadow ...	9	39·4	
Beginning of total phase ...	10	49·0	
Middle of the eclipse	11	33·7	
End of total phase	12	18·4	
Last contact with the shadow ...	13	28·0	
,, ,, penumbra	14	40·9	

The moon meets the shadow at a point on her limb which is 112° from her north point towards the eastern side, and passes out at a point 95° towards the west.

The magnitude of the eclipse is represented as 1·383, the unit representing the case when conditions are such that the moon is only just able to be totally immersed for an instant.

COMET CHASE.—This comet, which is gradually brightening, is situated in the constellation of Leo Minor, and lies slightly to the north of the 6th magnitude star 50 in Leo Minor. The following is the ephemeris to the end of the present month.

1898.	R.A. (app.) h. m. s.	Decl. (app.) ° ′	Br.
Dec. 22 ...	10 55 11 ...	+26 59·8 ...	1·39
24 ...	56 44 ...	27 19·0 ...	,,
26 ...	58 11 ...	27 38·8 ...	,,
28 ...	10 59 31 ...	27 59·0 ...	,,
30 ...	11 0 43 ...	+28 19·7 ...	1·39

COMETS *i* 1898 AND 1881 IV.—Writing in the *Astronomical Journal* (Nos. 448–450), Dr. Perrine, of the Lick Observatory, points out a distinct relationship between the comet *i* 1898 and 1881 IV. The similarity of the orbits is strikingly seen from the following comparison of the orbits:—

Comet.	ω	Ω		q
	° ′	° ′	° ′	
i 1898 ...	... 122 8 ...	97 17 ...	140 14 ...	0·6335
1881 IV....	... 123 22 ...	96 10 ...	140 19 ...	0·7564

Dr. Perrine states that although it is not possible for Brooks's comet to be a return of Schaeberle's, yet the resemblance is so close that a strong family connection is indicated. If we may be permitted to make a suggestion, might not there be two comets pursuing the same path? Just as comets are thinned out by their component parts lagging behind and following, so

©1898 Nature Publishing Group

to speak, in their wake, may not the first comet have undergone considerable perturbations and internal action, causing the original assembly of particles to separate into two or, perhaps, more portions? We should thus have two comets pursuing the same path, but passing perihelion at different times.

EPHEMERIS OF PLANET 1898 DQ.—We give below an ephemeris for Witt's planet for the remainder of this month. The planet is of the 12th magnitude, and will be found in the constellation of Aquarius, a little to the north of the stars η and ζ Aquarii.

1898.	R.A. (app.) h. m. s.	Dec. (App.) ° ′
Dec. 21	22 26 11	+1 31·8
23	30 35	1 54·2
25	35 2	2 17·0
27	39 32	2 40·3
29	44 5	3 4·0
31	22 48 40	+3 28·2

THE COMPANION TO THE OBSERVATORY FOR 1899.—This handy little *vade-mecum*, which contains in a condensed form the more useful data that are of more general interest in observational astronomy, has just been issued. As the introduction states, "the present 'Companion' closely resembles that of last year," and a brief perusal of its contents does not lead us to state otherwise. Mr. Denning, as usual, is responsible for the meteor notes, and Mr. Maw has supplied numerous observations of double stars. The variable-star ephemerides have been obtained from M. Loewy's "advance-proofs," and Mr. Crommelin has communicated the list of stars which will be occulted by the moon during the lunar eclipse of December 16.

THE SOLAR DISC DURING 1897.—The solar observatories at Dehra Dun, Mauritius, and Greenwich, give us between them pictures of the disc of the sun 364 days out of the 365 in the year. We have thus practically a daily record of the spots that appear on the solar disc that is absolutely unique in astronomical photography. As we are approaching, as far as we know, a period of minimum sunspots, which, in other words, means a more quiescent state of the solar atmosphere, spots are getting less numerous, and their latitudes are becoming lower. A general summary of an examination of such photographs, as mentioned above, for the year 1897 (*Monthly Notices.*, *R.A.S.*, vol. lix. No. 1), shows that there has been a slight decrease in the daily spotted area as compared with the preceding year, the rapidity of the decline which set in after 1893 having now received a check; the decrease in faculæ has been quite considerable. The most noticeable feature has been the reduction of the mean distance of the spots from the equator. For the four preceding years the distance was 14°, but for 1897 it was not quite 8°. In both hemispheres the decline in latitude has been irregular. In the northern hemisphere the decline was very great for the first six months of the year, and was accompanied with a great decrease in spots. A secondary revival and subsequent decline and revival terminated during the year. A similar but less pronounced movement occurred in the southern hemisphere. The observations of the sun during the current year have shown that the spotted area has begun somewhat to increase again; but whether this is an indication that the minimum is now passed, or that only a temporary revival is taking place, cannot be definitely stated.

THE MELBOURNE OBSERVATORY.—The thirty-second report of the Board of Visitors to the observatory, together with the report of the Government astronomer, Mr. P. Baracchi, for the period included between July 1, 1897, and June 30 of the present year, show that the observatory is in good working order. With regard to the position of Mr. Baracchi, the Board says: "We regret to find that the Acting Astronomer still occupies the anomalous position he has occupied since he has had charge of the Observatory; his salary being that which he enjoyed prior to the retirement of Mr Ellery, and we venture to hope that the Government will soon be able to appoint Mr. Baracchi to the full position of Government Astronomer, with the emolument fixed thereto under the Public Service Act." Mr. Baracchi's report shows that the observatory has been very busy during the past year. The appointment of a new assistant has led to a slight change in the distribution of the work, which has proved advantageous. The meridian work and reduction has been extensive, and the usual time and meteorological service continued. Considerable progress has been made with the astrophotographic work, the catalogue plates being now complete and the chart plates numbering 278. By an arrangement with Mr. H. C Russell, the Government Astronomer of New South Wales, Mr. Baracchi has decided to have all the work of measuring and reducing the plates of the photographic catalogue of the two zones done at the Melbourne Observatory, the two Colonies sharing the expense. The proposal that four young assistants, directed by one of the officers of the Melbourne Observatory, should be employed on this work, has already been sanctioned, and the work will be commenced as soon as the appointments have been made. The Victorian Government has placed on the estimates for the current financial year a sum of money for dealing with the observations in terrestrial magnetism at the Melbourne Observatory for the past thirty years. A discussion of such a fine series of observations should be of great value.

THE RELATION OF THE TOXIN AND ANTI-TOXIN OF SNAKE VENOM.

EARLY in the present year a paper on this subject, by Drs. C. J Martin and Cherry, appeared in the *Proceedings* of the Royal Society (vol. lxiii. p. 420). A short summary of their experiments and conclusions was given in these columns. A supplementary paper has just been published by Dr. Martin (*Proc. Roy. Soc.*, vol. lxiv. 88), in which further experiments on this most important subject are detailed. They confirm the conclusions previously arrived at, that the antagonism between the toxins and anti-toxins is a directly chemical one, and is not, as Calmette and others state, due to an interaction solely produced by the agency of the cells of the organism into which these substances enter.

The present experiments were performed with the snake venom derived from the Australian tiger-snake *Hoplocephalus curtus*); the anti-venene employed was prepared by Dr. Calmette; and rabbits were selected as the subjects of the experiments. The results obtained are not only of practical importance in the treatment of snake-poisoning, but are of special interest, as they bear on the relations of toxins and anti-toxins in general. In snake venom and its antidote we possess substances of which the chemical nature is fairly well understood. A knowledge of their action (which must be regarded as typical of the whole class of toxins and anti-toxins) furnishes the key to the unlocking of the problem in diphtheria and other diseases, where the chemical investigation of the actual agents is a much more difficult matter, since they are diluted and obscured by the other constituents of the blood and body juices.

Dr. Martin finds that about the same quantity of anti-venene necessary to neutralise the venom *in vitro*, is capable of doing so also when the former is injected into the blood-stream, and the latter subcutaneously. Solutions of the two substances can be titrated against each other just like standard solutions with the life of a rabbit as an indicator. If anti-venene is introduced into the blood-stream, it is there ready to neutralise the toxin as it is absorbed from the subcutaneous tissues, and the amount found necessary by titration outside the body is just about adequate to neutralise the toxin as it makes its appearance in the blood. To be quite exact, a slighter proportion of anti-toxin is necessary under these circumstances, and this result is no doubt due to delayed chemical action owing to the dilution of the anti-toxin in the blood.

When, however, both venom and anti-venene are introduced into the body subcutaneously, Martin finds, as Fraser originally stated, that at least ten to twenty times the quantity of anti-venene must be used to neutralise the toxin. This apparent contradiction of the results first given is really a confirmation of the views of Martin and Cherry. In the first place, it necessitates the inference that anti-toxin is comparatively slowly absorbed from the subcutaneous tissues. Calmette has stated that the exact contrary is the case, but adduces no experimental proofs of his statement. Brodie's (*Journ. of Pathol.*, 1897) work with the toxin and anti-toxin of diphtheria entirely confirms Martin's experiments with tiger-snake venom.

Our chemical knowledge of toxins and anti-toxins, together with what is known of the physiological mechanism of absorption, is quite in accordance with the view that anti-toxin is only capable of slowly penetrating the capillary wall, whereas the toxin passes through fairly rapidly. The toxins, both in the case of snake poison and diphtheria, are albumoses; they dialyse

©1898 Nature Publishing Group